



PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Appl. No.: 10/080,038
Applicant(s): Lamminen, et al.
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Title: ARRANGEMENT FOR MIXING FLOWS
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Commissioner for Patents
P.O. Box 1450
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AMENDMENT
37 C.F.R. § 1.121

Sir:

In response to the Office Action dated October 23, 2003, please amend the above-identified application as follows:

Amendments to the Claims are reflected in the listing of claims beginning on page 2 of this paper.

Remarks/Arguments begin on page 7 of this paper.

An **Appendix** including a copy of the postcard receipt and the English translation as filed is attached following page 11 of this paper.

Amendments to the Claims:

1. (Withdrawn) A method of mixing flows with each other in a papermaking process, according to which method a first flow is fed through a tube, and one or more second flows is/are fed into the first flow via a feed opening which is in connection with the space limited by said tube, wherein

- the first flow is conveyed in the tube to the mixing zone, which mixing zone comprises on the inner periphery of the tube at least one form part, the control surfaces of which form part extend a predetermined distance from the inner periphery of the tube towards the middle of the tube, and which control surfaces together with the inner periphery of the tube define the inner surface of the tube;

- turbulence is generated in the first flow by means of said control surfaces; and

- the second flow is fed to the mixing zone portion into the first flow through one or more feed openings positioned on the inner surface of the tube.

2. (Withdrawn) A method according to claim 1, wherein a second flow is fed through the feed opening in the form part into the first flow.

3. (Withdrawn) A method according to claim 1 or 2, wherein a fiber suspension is conveyed through the tube and some papermaking chemical is fed into said fiber suspension via the feed opening.

4. (Withdrawn) A method according to claim 3, wherein the first component of the two-component retention agent is fed prior to the form parts via the feed opening into the fiber suspension, which component forms flocs together with the solid matter in the fiber suspension; said flocs are broken by means of the turbulence generated by the form parts; and the second component of the retention agent is fed after the form parts, which regathers the flocs.

5. (Withdrawn) A method according to claim 1 or 2, wherein a first additive component is fed via a first feed channel, and a second additive component is fed via a second feed channel; said additive components are mixed with each other prior to the feeding into the mixing zone; and a second flow formed together with said additive components is dosed into the first flow.

6. (Currently Amended) A mixer comprising

- a tube, through which the first flow of the papermaking process is conveyed; and
- a feed opening which is in connection with the space limited by the tube and with a feed channel for mixing a second flow into the first flow through the feed opening;

wherein

- a mixing zone has been formed in the tube, comprising at least one form part on an ~~the~~ inner periphery of the tube;

- the form part comprises control surfaces which extend a predetermined distance from the inner periphery of the tube towards the middle of the tube for generating turbulence in said flow in the mixing zone of the tube;

- the inner periphery of the tube and the control surfaces of the form part define the inner surface of ~~the tube in~~ the mixing zone; and

- ~~the mixer comprises in the mixing zone portion on~~ the inner surface of the mixing zone is provided with ~~of the tube~~ one or more feed openings which is/are in connection with the feed channel and through which a second flow can be fed into the first flow, the first of the one or more feed openings for supplying the second flow being located at or after a front edge of the first form part in the direction of the first flow.

7. (Original) A mixer according to claim 6, wherein at least one form part comprises at least one feed opening, and the feed opening is in connection with a feed channel outside the tube.

8. (Original) A mixer according to claim 7, wherein the mixer comprises at least two successive form parts, seen in the longitudinal direction of the tube.

9. (Original) A mixer according to claim 7 or 8, wherein the form part comprises a transverse boring of the tube, the first end of which boring is in connection with the feed channel outside the tube, and the second end is in connection with the space limited by the tube.

10. (Original) A mixer according to claim 7 or 8, wherein the form part is hollow, and the feed channel is in connection with the hollow space of the form part, and one or more feed openings has/have been formed on the control surface of the form part.

11. (Original) A mixer according to claim 7 or 8, wherein the position of the form part relative to the tube is adjustable.

12. (Original) A mixer according to claim 7 or 8, wherein the shape of the form part is adjustable.

13. (Currently Amended) Feeding equipment of a head box of a paper machine, comprising

- a tube through which a first flow is conveyed to the head box;
- a feed opening which is in connection with the space limited by the tube and with the feed channel for feeding a second flow into the first flow through the feed opening; and
- a process component, such as a pump or screen, which is arranged in said tube before the head box,

wherein

- the tube comprises a mixing zone extending from the nearest process component preceding the head box to the head box;
- the mixing zone comprises at least one form part on an ~~the~~ inner periphery of the tube;

- the form part comprises control surfaces extending a predetermined distance from the inner periphery of the tube towards the middle of the tube for generating turbulence in said flow in the mixing zone of the tube;

- the inner periphery of the tube and the control surfaces of the form part define the inner surface of ~~the tube in~~ the mixing zone, and

- ~~in the portion of the mixing zone~~, the inner surface of the mixing zone of the tube is provided with one or more feed openings, which is/are in connection with the feed channel and through which the second flow can be fed into the first flow, the first of the one or more feed openings for supplying the second flow being located at or after a front edge of the first form part in the direction of the first flow.

14. (Original) Feeding equipment according to claim 13, wherein at least one form part comprises at least one feed opening, and the feed opening is in connection with the feed channel outside the tube.

15. (Currently Amended) ~~Feeding-Mixing~~ equipment according to claim 13 or 14; wherein the feeding equipment comprises in the mixing zone before the form parts a feed opening for conveying the first component of a two-component retention agent into the fiber suspension flowing through the tube, and the feeding equipment comprises in the mixing zone a second feed opening for feeding the second component of the retention agent into the flow mixed by the turbulence generated by the form parts.

16. (Original) Feeding equipment according to claim 13 or 14, wherein the tube is divided after the nearest process component preceding the head box into at least two secondary tubes, along which the first flow is conveyed from said process component to a multilayer head box or to the head boxes of a multiply wire section, and at least one secondary tube comprises at least one form part and at least one feed opening for feeding the second flow into the flow flowing through the secondary tube.

17. (New) A mixer comprising

- a tube, through which the first flow of the papermaking process is conveyed; and
- a feed opening which is in connection with the space limited by the tube and with a feed channel for mixing a second flow into the first flow through the feed opening;

wherein

- a mixing zone has been formed in the tube, comprising at least one form part on an inner periphery of the tube;

- the form part comprises control surfaces which extend a predetermined distance from the inner periphery of the tube towards the middle of the tube for generating turbulence in said flow in the mixing zone of the tube;

- the inner periphery of the tube and the control surfaces of the form part define the inner surface of the mixing zone; and

- the inner surface of the mixing zone is provided with one or more feed openings which is/are in connection with the feed channel and through which a second flow can be fed into the first flow, at least one of the feed openings for supplying the second flow being located in at least one of the control surfaces of at least one form part.

18. (New) A mixer according to claim 17, wherein the mixer comprises at least two successive form parts, seen in the longitudinal direction of the tube.

19. (New) A mixer according to claim 17, wherein the form part comprises a transverse boring of the tube, the first end of which boring is in connection with the feed channel outside the tube, and the second end is in connection with the space limited by the tube.

20. (New) A mixer according to claim 17, wherein the form part is hollow, and the feed channel is in connection with the hollow space of the form part, and one or more feed openings has/have been formed on the control surface of the form part.